

AMENDMENTS TO THE CLAIMS

Please amend pending claims as indicated below. The following is a listing of claims will replace all prior versions and listing of claims in the application.

1. (Currently Amended): A robot comprising:

a motion unit;

a two-dimensional (2D) array of detectors supported by the motion unit, each detector having a counter associated therewith, the 2D array operable to generate a frame of distance indications to one or more features in an environment in which the robot operates;

an infrared sensor including: (a) an infrared light source configured to produce a plurality of modulated pulses of infrared light directed toward the environment of the robot; and (b) at least one optic element configured to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the 2D array of detectors, causing the detection of the 2D array of detectors, wherein the modulated pulses enable detection of low-energy diffuse reflections; and

at least one processor operatively coupled to the 2D array of detectors, the processor operable: (a) to determine one or more features of the environment based at least in part on one or more frames of distance indications; and (b) to control the motion unit of the robot to avoid the one or more detected features.

2. (Previously Presented): The robot of claim 1, wherein the distance indication is produced by the counter measuring a period of time to receive a reflected pulse.

3. (Previously Presented): The robot of claim 1, wherein the distance indication is produced by measuring an energy of a reflected pulse up to a cutoff time.
4. (Previously Presented): The robot of claim 2, wherein the feature is indicated in an internal map of the environment.
5. (Previously Presented): The robot of claim 2, wherein the feature is a step.
6. (Previously Presented): The robot of claim 2, wherein the feature is an object in a room.
7. (Original): The robot of claim 1, wherein the robot is a robot cleaner.
8. (Currently Amended): A method for controlling a robot comprising:
producing a plurality of modulated pulses of infrared light directed toward an environment of the robot;
focusing with at least one optic element a plurality of reflections of the infrared light pulses from the environment of the robot to a two-dimensional (2D) array of detectors;
detecting by the 2D array of detectors the plurality of reflections of the infrared light pulses, wherein the modulated pulses enable detection of low-energy diffuse reflections;
generating a frame of distance indications to one or more features in the environment;
processing the generated one or more frames of distance indications to determine one or more features of the environment; and

controlling the motion of the robot to avoid the one or more features of the environment.

9. (Previously Presented): The method of claim 8, wherein the distance indication is produced by a counter measuring the time to receive a reflected pulse.

10. (Previously Presented): The method of claim 8, wherein the distance indication is produced by measuring the energy of a reflected pulse up to a cutoff time.

11. (Previously Presented): The method of claim 9, wherein the feature is indicated in an internal map of the environment.

12. (Previously Presented): The method of claim 9, wherein the feature is a step.

13. (Previously Presented): The method of claim 9, wherein the feature is an object in a room.

14. (Previously Presented): The method of claim 8, wherein the robot is a robot cleaner.

15. (Currently Amended): A robot comprising:
an infrared light source configured to produce a plurality of modulated pulses of infrared light directed toward an environment of the robot;
a two-dimensional (2D) array of detectors, each detector having a counter associated therewith, the 2D array operable:

(a) to detect a plurality of reflections of the infrared light pulses from the environment, including low-energy diffuse reflections; and

(b) to generate a frame of distance indications to one or more features of the environment;

at least one processor operatively coupled to the 2D array of detectors, the processor operable:

(a) to determine one or more features of the environment based at least in part on one or more frames of distance indications; and

(b) to control the motion of the robot to avoid the one or more detected features.

16. (Previously Presented): The robot of claim 15, wherein the distance indication is produced by the counter measuring a period of time to receive a reflected pulse.

17. (Previously Presented): The robot of claim 15, wherein the distance indication is produced by measuring an energy of a reflected pulse up to a cutoff time.

18. (Previously Presented): The robot of claim 16, wherein the feature is indicated in an internal map of the environment.

19. (Previously Presented): The robot of claim 16, wherein the feature is a step.

20. (Previously Presented): The robot of claim 16, wherein the feature is an object in a room.

21. (Original): The robot of claim 15, wherein the robot is a robot cleaner.

22-23. (Canceled)

24. (Currently Amended): A method for controlling a robot comprising:
transmitting a plurality of modulated pulses of infrared light toward an environment of
the robot;

detecting by an infrared detector a plurality of low-energy diffuse reflections of the
infrared light pulses indicating distances to one or more features of an environment;
retrieving from a memory device of the robot one or more two-dimensional (2D) frames
of distance indications to one or more features of an environment in which the robot operates;
processing [[the]] one or more retrieved 2D frames of distance indications to determine
one or more features of the environment;
adding the one or more determined features to an internal map of the environment; and
controlling the motion of the robot to avoid the one or more features of the environment.

25. (Canceled)

26. (Previously Presented): The method of claim 24, wherein the distance indication is
produced by measuring the time to receive a reflected pulse from one or more features of the
environment.

27. (Previously Presented): The method of claim 24, wherein the distance indication is produced by measuring the energy of a reflected pulse from one or more features of the environment.

28. (Previously Presented): The method of claim 25, wherein one or more features are indicated in the internal map of the environment.

29. (Previously Presented): The method of claim 25, wherein the feature is a step.

30. (Previously Presented): The method of claim 25, wherein the feature is an object in a room.

31. (Original): The method of claim 24, wherein the robot is a robot cleaner.

32-33. (Cancelled)

34. (Previously Presented) The robot of claim 1, wherein the processor is further operable to add the one or more determined features to an internal map of the environment.

35. (Currently Amended) The robot of claim 1, further comprising a memory device for storing the one or more frames of distance indications.

36. (Cancelled)

37. (Previously Presented) The robot of claim 15, wherein the processor is further operable to add the one or more determined features to an internal map of the environment.

38. (Currently Amended) The robot of claim 15, further comprising a memory device for storing the one or more frames of distance indications.